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species as occur on river banks, the stolons of which grow in the water, creeping over the muddy bottom. Among these are *Mentha aquatica, Lysimachia vulgaris, Lycopus europaeus, Stachys palustris,* partly also *Potentilla reptans, Ranunculus repens,* and *Cynodon Dactylon.* In these the vegetative reproduction is amply secured by the ability of the fragments of the rhizomes and stolons to root very easily, and at the same time the water currents help to disperse such fragments over wide areas. The seedling stage of Butomus, various species of Alisma, Sagittaria, Najas, and Potamogeton is described. The slow growth of the primary root is characteristic, while the hypocotyl attains its final length in a very short time, and before the root actually commences its increase in length. The primary root stele in Butomus and in Alismaceae consists of a single central vessel and of two strands of leptome diametrically opposite each other. In the Najadaceae, on the other hand, several vessels are developed, the largest of which is usually located in or near the center, and there are also several strands of leptome, corresponding in number with the rays of hadrome. The hypocotyl exhibits a bilateral structure in Butomus and Alisma and no pericycle was observed inside the endodermis. In the Najadaceae the bilateral structure is much less pronounced, and no stomata were observed in the epidermis of the hypocotyl of any of these plants. A very simple structure characterizes the cotyledon; the chlorenchyma is homogeneous and contains only one vein near the ventral face. The seedling stages are very carefully described and figured, adding several interesting points to the knowledge of the structure of aquatic plants.—THEO. HOLM.

**Organic correlations.**—EAST[19] attempts a classification of correlations with especial consideration of plant data. This is a little-known field at the present time, but one of great promise for the future. The writer of course realizes that this tentative classification awaits the accumulation of further data to place it on any satisfactory basis. Correlations are considered as "somatic" and "gametic." Under somatic correlations are classed: (1) correlated reactions to environment; here are placed the experimental results of MACDOUGAL in Raimannia and of TOWER in Leptinotarsa, although the indications are that these changes are germinal and not somatic; (2) growth correlations between (*a*) non-homologous, (*b*) homologous, and (*c*) meristic parts; (3) correlations in organs of a plant; (4) interdependent and exclusive development; here is cited the case of *Oenothera lata,* in which the broad-leaved character is associated with the "inability to produce healthy pollen;" but this association is not constant, for plants from England having the *O. lata* characters have been successfully self-pollinated;[20]

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[19] EAST, EDWARD M., Organic correlations. Amer. Breeders' Assoc. 4:pp. 12. 1908.

[20] MACDOUGAL, D. T., VAIL, A. M., AND SHULL, G. H., Mutations, variations, and relationships of the Oenotheras. Carnegie Inst. Publ. 81:pp. 92. 1907; and unpublished results of the reviewer.

(5) heterozygotes; in the numerous cases where heterozygotes differ from either parent, "the ability to transmit certain characters is correlated with other *apparent* characters." Under gametic correlations are placed the phenomena of partial and complete "coupling," so called, developed chiefly by BATESON.—R. R. GATES.

**Tyloses in ferns.**—It has been noted by various writers that in the stems and petioles of ferns the protoxylem groups suffer disintegration, and into the cavities so formed the wood-parenchyma grows, forming the "cavity-parenchyma" of Russow. Proliferations from these cells frequently fill the cavities, and present the appearance of tyloses. These growths have recently been studied in detail by two independent workers, KIRSCH[21] and Miss MCNICHOL.[22] Both writers show that the phenomenon is widespread, being found in nearly every family of the true ferns, as well as in Marsilia and the Ophioglossaceae. In both papers the cells in question are carefully described and their origin as stated above is proven. KIRSCH has studied *Pteris aquilina* in most detail, and finds cavity-parenchyma in the stipe and in all regions of the rhizome, where it occurs in the outer system of bundles which he erroneously regards as cortical (p. 388). He offers the following as a theory of the cause of these growths: the cavity formed by disintegration of the protoxylem at first functions as a water duct; later the metaxylem (secondary xylem according to KIRSCH) makes its appearance and performs the duty of water carrier. Hence the pressure in the cavity is reduced, and as a consequence tyloses grow into it.—M. A. CHRYSLER.

**Composition of a field of maize.**—A brief paper by SHULL[23] calls attention to the view, already expressed by DEVRIES and others, that a field of corn, like wheat and other grains, is made up of a number of elementary species or biotypes. He discusses the fact that inbreeding in corn results in deterioration, and points out that the old hypothesis that the deleterious effects of inbreeding result from the accumulation of disadvantageous individual variations to form an organism with an inharmonious or unbalanced constitution, is untenable, in view of the facts of cleistogamy, self-pollination, and parthenogenesis in plants which have evidently been successful in the struggle for existence. A cornfield is conceived to be a series of hybrids between elementary species, and on the basis of the common observation that hybrids between nearly related forms are more vigorous than either parent, he believes that over-selection, which eliminates down to a single biotype, results in deterioration, not intrinsically from inbreeding, but because the greater vigor which comes from the crossing of biotypes has been eliminated. The

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[21] KIRSCH, SIMON, On the development and function of certain structures in the stipe and rhizome of *Pteris aquilina* and other Pteridophytes. Trans. Royal Soc. Canada III. 14:353–412. *figs. 27+21.* 1907.

[22] MCNICHOL, M., On cavity parenchyma and tyloses in ferns. Annals of Botany 22:401–413. *pl. 25.* 1908.

[23] SHULL, GEO. H., The composition of a field of maize. Amer. Breeders' Assoc. 4:pp. 6. 1908.